CITY OF Ames

Caring People ◆ Quality Programs ◆ Exceptional Service

MEMO

ITEMS 1 & 2

To: Mayor and City Council

From: Bob Kindred

Date: February 14, 2014

Subject: City Council Workshop – February 18, 2014

Mayor and Council:

In anticipation of Tuesday's Council workshops, we are sending you Power Point presentations in PDF for both topics. Reviewing these slides in advance should help you get a head start on both topics, which hopefully will allow staff to do a more effective job while going through these complex topics on Tuesday night.

The first topic is driven by our need to comply with federal and state laws requiring adoption of a post-construction storm water ordinance. We plan to cover the following areas:

<u>Post-Construction Stormwater Ordinance</u>
Stormwater management orientation (Stormwater 101)
Current methods for managing stormwater
State MS4 Stormwater Permit
Process followed to develop proposed ordinance
Current stormwater requirements
Proposed stormwater requirements
Council direction needed
Maintenance alternatives
Performance bonding
Appeals
Next steps

The second topic addresses a goal from the previous City Council to mitigate flooding (both in the flood plain and in local areas). Council directed us to schedule a workshop where they could be informed and educated regarding flood plain regulations, after which they would decide if further steps were warranted. This presentation will cover the following areas:

<u>Flood Plain Regulations</u>
Orientation to flood plains (Flood Plains 101)
Review current Ames flood plain regulations
Overview of other potential flood plain regulations
Recap both existing and potential efforts to address localized flooding
Council Q/A

We look forward to a learning time together on Tuesday!

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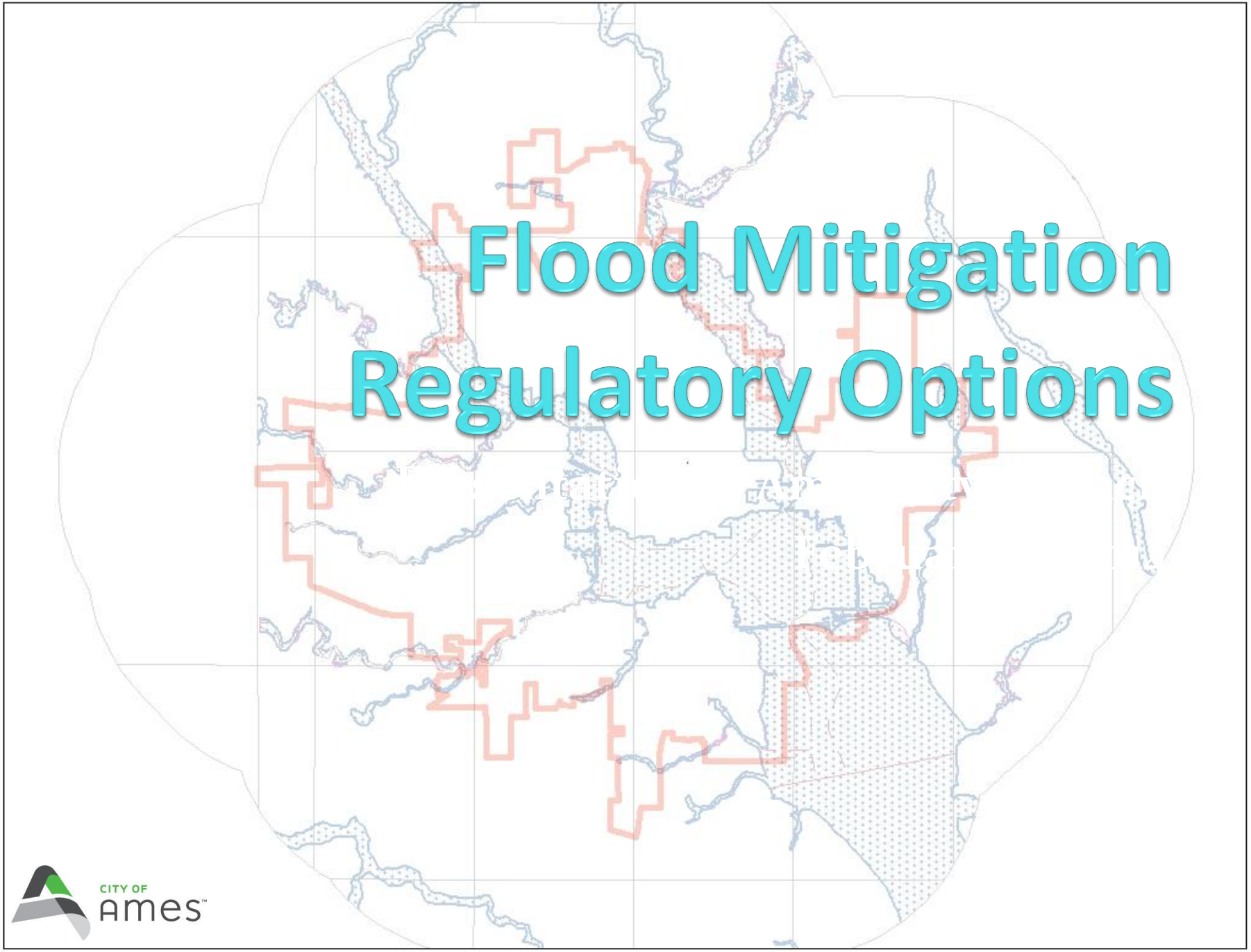


Flood Mitigation Regulatory Options

CITY OF ames

Overview

- Goal from the previous City Council was to “Mitigate Flooding in our Community”
  - Reduce possibility of damage in our community caused by river/watershed flooding
  - Reduce possibility of damage in our community caused by localized flooding
- HDR Flood Mitigation Study
  - Physical improvements
  - Watershed Management Authority
  - Regulatory options

River/watershed Flooding

- Flood Plain Management 101
- Ames's and other cities' approaches
- Possible approaches to regulations

Basis of Regulations

- National Flood Insurance Program (NFIP)
  - Allows property owners in participating communities to purchase flood insurance from private agents
  - Requires cities to set minimum standards for floodplain management
- Iowa Dept. of Natural Resources
  - Oversees participation at local level
  - Provides “model ordinance” to communities

Ames' Participation in NFIP

- Initial mapping done in 1977
- First Flood Insurance Rate Map (FIRM) done in 1981
- Current flood maps adopted in 2008
- Current floodplain management ordinance adopted in 2009
- Physical Map Revision (PMR) underway for College and Worle Creeks

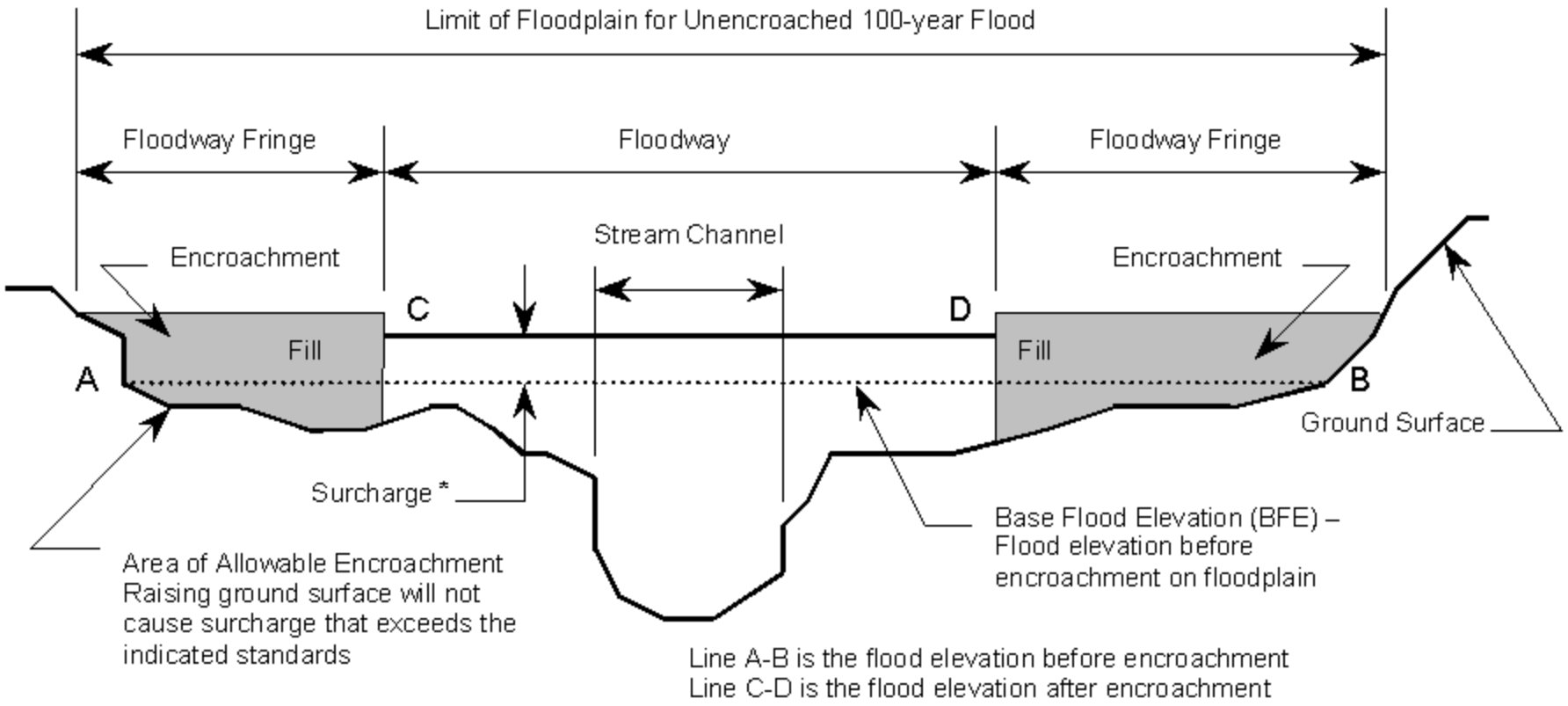
Regulatory Terms

- 100-year floodplain ≡ the area inundated by a flood having a 1% chance of occurring in any given year

- 500-year floodplain ≡ the area inundated by a flood having a 0.2% chance of occurring in any given year

Regulatory Terms (cont'd)

- BFE (Base Flood Elevation) ≡ the water surface level of the 100-year flood event (1% annual chance flood)
- Floodway Fringe ≡ that portion of the 1% annual chance floodplain outside of the Floodway
- Floodway ≡ that portion of the 1% annual chance floodplain that will carry flood waters when the floodway fringe is restricted enough to raise the water surface elevation one foot



*Surcharge not to exceed 1.0 ft. (FEMA requirement) or lesser height if specified by community

Floodplain·Encroachment·and·Floodway

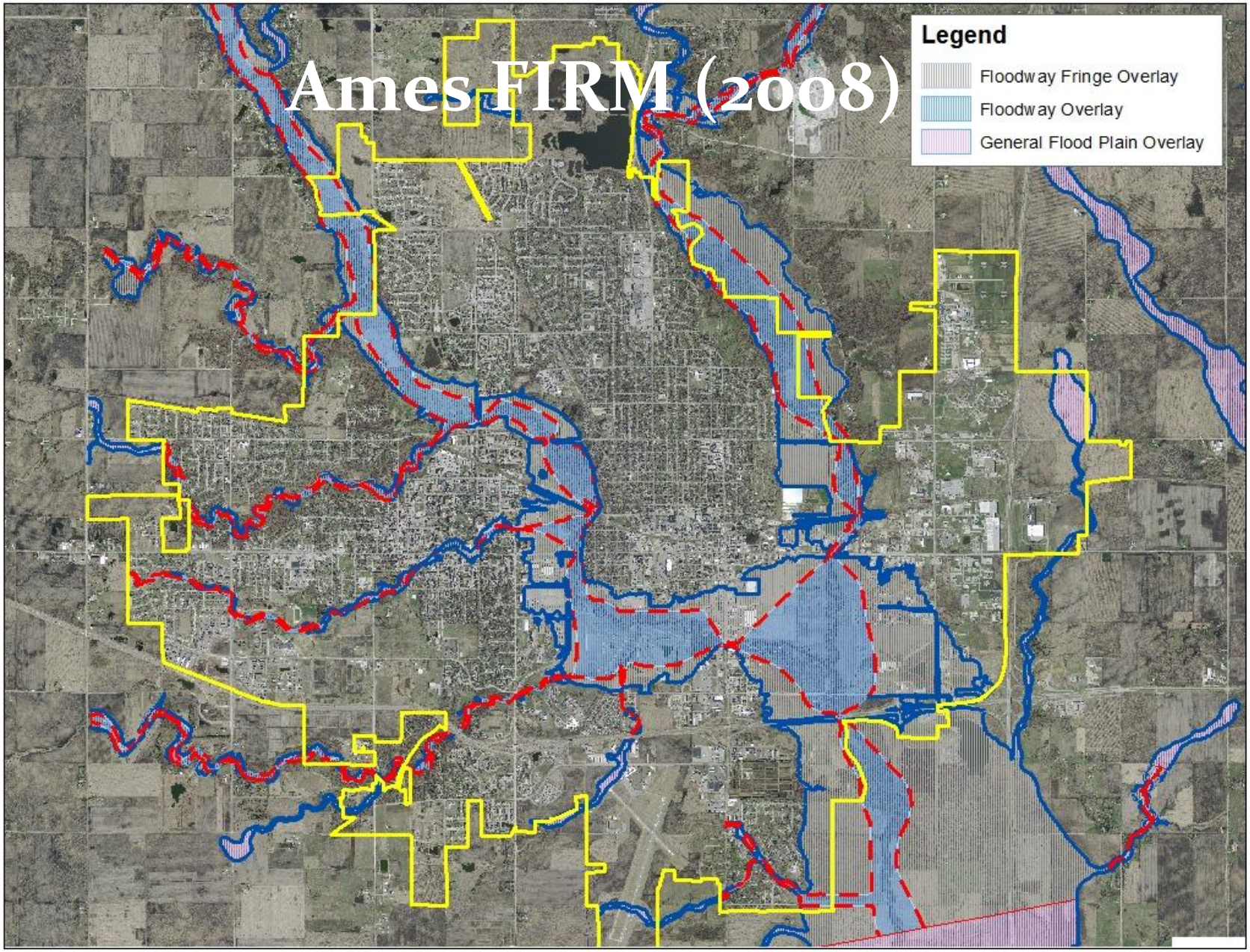
Ames's Regulations

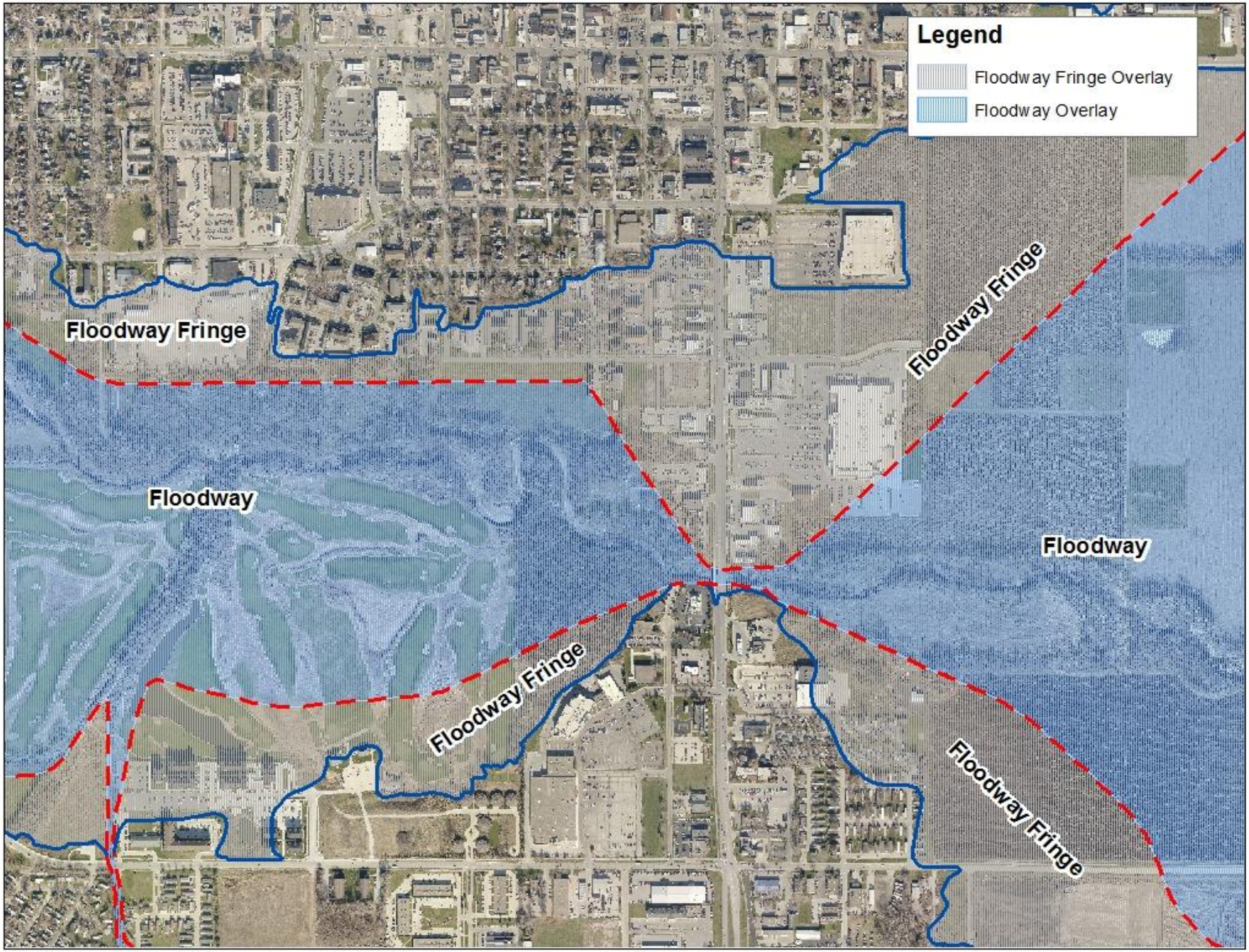
- Floodway Fringe
  - Any uses allowed by zoning
  - New or substantial improvements must elevate or flood proof to 3' above BFE
  - Minor improvements are not required to meet standards
  - Local floodplain development permit (reviewed and approved administratively) needed for all development in Floodway Fringe, including fill excavation, grading, construction

Ames's Regulations (cont'd)

- Floodway
  - Open space uses for the most part (e.g., farming, golf courses, parks)
  - Structures allowed only under certain circumstances (non-habitable, low-value, e.g., storage sheds)
  - Usually requires Conditional Use Permit from Zoning Board of Adjustment and local floodplain development permit
  - Must demonstrate that the development will not increase water surface elevation of 100-year flood (usually with an engineer preparing a "No-Rise" certificate)

Ames FIRM (2008)




Legend
Floodway Fringe Overlay
Floodway Overlay
Floodway Fringe
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Ames Mitigation Approaches

- Conveyance Improvements
  - Restoration of Squaw Creek channel 2000' upstream and downstream from S. Duff Avenue bridge (CIP 2015/'16 and 2016/'17)
  - Lengthening US 30 bridge (not in CIP)

What do other cities do?

- **Cedar Rapids**
  - Engineer analysis of all floodplain development to determine impacts
  - New and substantial improvements must be elevated to 100-year flood water level +1' (BFE+1')
  - Cedar Rapids will build levees on both sides of the Cedar River

- **Cedar Falls**
  - No new buildable lots in 500-year floodplain
  - On existing lot, no more than 1/3 of lot may be filled, no more than 3' above natural grade, and equivalent volume must be removed from floodplain
  - New or substantial improvements must be elevated to 500-year flood water level +1'
  - Class 1 'Critical Facilities' prohibited in 100-year and 500-year floodplain

- **Iowa City**
  - New and substantial improvements must be elevated to 100-year water level +1' (BFE+1')
  - Class 1 'Critical Facilities' prohibited in 100-year and 500-year floodplain

Possible approaches to regulations

- Minimize flood damage to new development?
- Minimize flood damage to existing development?
- Minimize new development effects on the flood plain for existing development?
- Remove all development to take the flood plain back to 1864 conditions?

Categories of regulatory options

1. Restrict new development
2. Additional performance standards for new development
3. Bring non-conforming (low elevation) structures into compliance
4. Revise regulatory maps

Restrict New Development

- Treat the 1% annual chance floodplain as if it were the Floodway (no building in the 100-year floodplain)
  - Large portions of land would lose all development potential.
  - Would create large numbers of non-conforming structures
  - Impact on property tax base and sales tax revenue
  - Relies on existing maps which may not reflect accurate flood occurrences

Restrict New Development

- Treat the 0.2% annual chance floodplain as if it were the Floodway (no building in the 500-year floodplain)
  - Same effects on development as 100-year floodplain scenario
  - No appreciable difference in area compared to 100-year around Duff Avenue
  - Generally the extent of the 2010 flood is the 500-year plain

Increase Performance Standards

- Regulate to 1% annual chance (100-year floodplain) to BFE + 5'
  - Applies only to new development
  - Any new structure would need to elevate an additional 2 feet above current regulations
  - Would create a canyon effect as new development occurs (e.g., along S. Duff Avenue)
  - Requires more filling of site to avoid steep approaches to elevated structures
  - Relies on existing maps which do not reflect recent flood occurrences

Increase Performance Standards

- Regulate to 0.2% annual chance (500-year floodplain) BFE +3'
  - Along Squaw Creek, water surface level of 500-year flood is about 2.5' above 100-year flood
  - This approach would be similar to 100-year BFE +5'
    - Similar site development effects

Increase Performance Standards

- Require on-site compensatory improvements (Introduce no net fill in floodway fringe)
  - Any elevation of building would require equal excavation on-site
  - Development would not increase water surface elevation of flood event
  - Would increase differences between elevation of building and parking area (steeper slopes)

Increase Performance Standards

- Require hydraulic modeling for development
  - Every project has an impact of Floodway Fringe and BFE
  - Modeling would demonstrate the impact and identify mitigation
  - Costs for development would increase
  - Would need to identify amount of allowable impact (e.g., no impact/"no-rise"/no change to inundation extent)

Bring Lower Structures into Compliance

- Adopt Cumulative Damage Limits
  - Currently, if damaged 50% or more, structure can be rebuilt only in accordance with performance standards. Buildings can suffer repeated damage and be rebuilt as long as no single flood event damages greater than 50%
  - Cumulative damage limits allow for additive damage percentages. E.g., two floods in 10 years (or over lifetime) each causing 30% damage requires performance standards to be met.

Revise regulatory maps

- New maps with different flood occurrences and more accurate topography
  - Use a different regulatory flood (currently FEMA's 1% annual chance flood)
  - Options can be based on HDR Flood Mitigation Study inundation maps

Localized Flooding

- Current steps to mitigate localized flooding:

- Native Landscaping at Community Center (manages water quality volume)
- Bioretention cell at Community Center (manages water quality volume)
- Enhanced rain garden at Community Center (manages water quality and channel protection volumes)
- 11 Acres of native prairie in Ames Parks (manages water quality from some parking lots)
- Bioretention cell on Edison at Operations Facility (manages water quality and channel protection volumes)
- Bioretention cell on Whitney at Operation Facility (manages water quality and channel protection volumes)
- Blackwood Pervious Concrete Street (manages water quality volume)
- Billy Sunday Road Porous Asphalt Sidewalk (manages water quality volume)
- Ash Avenue Bioretention Cell and Traffic Calming (manages water quality volume)

- College Creek Streambank Stabilization (water quality and channel protection)
- Emerson Drive Rain Garden Gallery (in College Creek watershed) (manages water quality volume)
- College Creek/Daley Park riparian buffers (2 acres of native plants)
- Clark Avenue Pervious Concrete (water quality)
- Main Street Alley Pervious Concrete (water quality)
- Gilchrist Street Pervious Concrete (water quality)
- Moore Memorial Park Pond Rehabilitation/Northridge Parkway Subdivision Flood Control (manages water quality and channel protection volumes along with flood control)
- Clear Creek Streambank Stabilization (near Utah Drive) (channel protection)
- Squaw Creek Streambank Stabilization (near N. Riverside Avenue) (channel protection)
- Skunk River Bank Stabilization (south of U.S. Highway 30) (channel protection)

- Urban Stream Assessment, 2007 (includes Onion Creek, Clear Creek, College Creek, and Worle Creek)

- Urban Stream Assessment update, 2011 (includes S. Skunk River, Squaw Creek, Onion Creek, Clear Creek, College Creek, Worle Creek, and Ada Hayden tributary) – this project expands on and updates the 2006 data (post 2008 and 2010 community floods) and includes stream channel conditions, stream bank erosion, channel nick points, low head dams, culvert discharge points, ground water seeps, and installation of 8 streambank pins for monitoring erosion.

- Water quality grants (WIRB and SRF Sponsored Projects)

- Prioritized w/ current CIP programs (various pavement improvements, Low Pt Drainage, Erosion Control, Storm Water Facility Rehabilitation, etc.)

Potential future steps to mitigate localized flooding:

- Adopt updated Post-Construction Stormwater Management Ordinance
- Build larger storm sewers (this could cause further stream erosion)
- Retrofit impervious surfaces (reduce impervious area, add permeable pavement)
- Increase funding and marketing of cost-sharing rebates (target neighborhoods)
- Create funding for a permeable pavement cost-sharing rebate
- Install subsurface detention within the Right-of-Way
- Install additional stormwater management facilities in neighborhoods where they do not currently exist
- Enhance/expand existing stormwater management facilities
- Inspect/enforce/clean existing stormwater easements